

What is claimed is:

1           1.     A rewritable data storage using a carbonaceous material  
2 comprising:  
3           a writing plate formed of a substrate, and a conductive layer deposited on  
4 the substrate; and  
5           a tip for forming or eliminating carbonaceous material in the form of spots  
6 on the writing plate, the spots representing information recorded on the  
7 conductive layer.

1           2.     The rewritable data storage using a carbonaceous material of claim  
2 1, wherein the substrate is formed of  $\text{SiO}_2/\text{Si}$ .

1           3.     The rewritable data storage using a carbonaceous material of claim  
2 1, wherein the conductive layer is formed of Au.

1           4.     The rewritable data storage using a carbonaceous material of claim  
2 1, wherein the tip is formed of Ti coated on a tip-shaped Si core.

1           5.     A rewritable data storage using a carbonaceous material  
2 comprising:  
3           a writing plate comprised of a substrate having striped conductive layer  
4 patterns formed on the substrate; and  
5           a tip disposed in an array having a regular interval corresponding to the

6 striped conductive layer patterns along a cantilever extending across the striped  
7 conductive layer patterns in order to form or eliminate carbonaceous material in  
8 the form of spots, the spots representing information recorded on the striped  
9 conductive layer patterns.

1 6. The rewritable data storage using a carbonaceous material of claim  
2 5, wherein the substrate is formed of  $\text{SiO}_2/\text{Si}$ .

1 7. The rewritable data storage using a carbonaceous material of claim  
2 5, wherein the conductive layer is formed of Au.

1 8. The rewritable data storage using a carbonaceous material of claim  
2 5, wherein the tip is formed of Ti coated on a tip-shaped Si core.

1 9. A method of writing/reading a rewritable data storage using a  
2 carbonaceous material, the rewritable data storage having a writing plate  
3 formed of a substrate with a conductive layer formed on the substrate and a tip  
4 for forming or eliminating a carbonaceous material in the form of spots  
5 representing information recorded on the conductive layer, the method  
6 comprising:

7 (a) writing information by applying a predetermined bias voltage to the  
8 space between the tip and the conductive layer and forming a carbonaceous  
9 material on the conductive layer;

10 (b) erasing the information by applying a voltage of reverse polarity to  
11 the bias voltage applied in step (a) to the space between the tip and the  
12 conductive layer, and eliminating the carbonaceous material already formed;  
13 and

14 (c) reading the information by comparing topography between the  
15 conductive layer and the carbonaceous material.

1 10. The method of writing/reading the rewritable data storage using a  
2 carbonaceous material as claimed in claim 9, wherein,

3 the size of spots of the carbonaceous material formed in step (a) is  
4 determined by controlling (1) the magnitude of the bias voltage applied across  
5 the space between the conductive layer and the tip and/or (2) the time duration  
6 for which the bias voltage is applied.

1 11. The method of writing/reading the rewritable data storage using a  
2 carbonaceous material as claimed in claim 9, wherein the size of spots of the  
3 carbonaceous material eliminated in step (b) is decided by controlling the  
4 magnitude of the bias voltage applied across the space between the conductive  
5 layer and the tip or the time duration for which the bias voltage is applied.

1 12. The writing/reading method of the rewritable data storage using a  
2 carbonaceous material as claimed in claim 9, wherein step (c) is performed  
3 using one of a capacitance difference, a resistance difference, a frictional

4 coefficient difference, and a height difference between the conductive layer and  
5 the carbonaceous material.

1 13. A method of writing/reading a rewritable data storage using a  
2 carbonaceous material, the rewritable data storage including a writing plate  
3 comprising a substrate on which striped conductive layer patterns are formed by  
4 depositing a conductor on the substrate; and a tip disposed in an array having a  
5 regular interval to correspond to the striped conductive layer patterns in a  
6 cantilever extending across the striped conductive layer patterns for forming or  
7 eliminating a carbonaceous material in the form of spots representing  
8 information recorded on the conductive layer, including:

9 (a) writing information by positioning the cantilever, applying a  
10 predetermined bias voltage to the space between the cantilever tip and the  
11 selected conductive layer pattern and forming a carbonaceous material in the  
12 selected region of the selected conductive layer pattern;

13 (b) erasing the information by positioning the cantilever, applying a  
14 voltage of reverse polarity to the bias voltage applied in step (a) to the space  
15 between the cantilever tip and the selected conductive layer pattern, and  
16 eliminating the carbonaceous material already formed; and

17 (c) reading the information by distinguishing topographical differences  
18 between the conductive layer patterns and the carbonaceous material.

1 14. The method of writing/reading of a rewritable data storage using a

2 carbonaceous material as claimed in claim 13, wherein the size of spots of the  
3 carbonaceous material formed in step (a) is determined by (1) controlling the  
4 magnitude of the bias voltage applied across the space between the conductive  
5 layer patterns and the cantilever tip, and/or (2) the time duration for which the  
6 bias voltage is applied.

1 15. The method of writing/reading a rewritable data storage using a  
2 carbonaceous material as claimed in claim 13, wherein the size of spots of the  
3 carbonaceous material eliminated in step 13 is determined by controlling (1) the  
4 magnitude of the bias voltage applied across the space between the conductive  
5 layer patterns and the cantilever tip, and/or (2) the time duration for which the  
6 bias voltage is applied.

1 16. The method of writing/reading the rewritable data storage using a  
2 carbonaceous material as claimed in claim 13, wherein step (c) is performed  
3 using one of a capacitance difference, a resistance difference, a frictional  
4 coefficient difference, and a height difference between the conductive layer  
5 patterns and the carbonaceous material.